



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
PATENT OPERATIONS

Art Unit: (Examiner)
Applicants: BADRI et al.
Serial No: 09/763,009
Filed: February 13, 2001
Title: METHOD AND DEVICE FOR TRANSMITTING SYMBOLS USING A
PLURALITY OF CARRIERS AND METHOD AND DEVICE FOR
RECEIVING INFORMATION SYMBOLS

Charlotte, North Carolina
July 11, 2001

Honorable Commissioner of Patents and Trademarks
Washington, D. C. 20231

SUBMISSION OF DOCUMENT

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Dear Sir:

Please enter into the file of the subject application the following enclosed document:

1. English translation of the International Preliminary Examination Report.

Respectfully submitted,

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RHD/ljc
Attachment
Attorney's Docket 3104



Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference FH990401PCT		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP99/02752	International filing date (day/month/year) 15 April 1999 (15.04.99)	Priority date (day/month/year) 18 August 1998 (18.08.98)	
International Patent Classification (IPC) or national classification and IPC H04L 27/26			
Applicant FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V.			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
These annexes consist of a total of 18 sheets.

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3. This report contains indications relating to the following items:
 - I ☒ Basis of the report
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 23 December 1999 (23.12.99)	Date of completion of this report 10 November 2000 (10.11.2000)
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/EP99/02752

I. Basis of the report

1. This report has been drawn on the basis of *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*:

☒ the international application as originally filed.

☐ the description, pages 1-3,5,7-12,14-35, as originally filed,
pages _____, filed with the demand,
pages 4,4a-4b,6,13, filed with the letter of 25 July 2000 (25.07.2000),
pages _____, filed with the letter of _____.

☐ the claims, Nos. _____, as originally filed,
Nos. _____, as amended under Article 19,
Nos. _____, filed with the demand,
Nos. _____, filed with the letter of _____,
Nos. 1-37, filed with the letter of 23 December 1999 (23.12.1999).

☐ the drawings, sheets/fig 1/6-6/6, as originally filed,
sheets/fig _____, filed with the demand,
sheets/fig _____, filed with the letter of _____,
sheets/fig _____, filed with the letter of _____.

2. The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/fig _____

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/EP 99/02752

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability: citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-37	YES
	Claims		NO
Inventive step (IS)	Claims	1-37	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-37	YES
	Claims		NO

2. Citations and explanations

1. The subject matter of Claim 1 is novel and involves an inventive step (PCT Article 33(2) and (3)):

1.1 Claim 1 pertains to a process for sending information symbols with a plurality of carriers. In the process, transmission symbols are generated from the information symbol and their transmission is deferred.

Such time-diversity processes are generally known, for example from **US-A-3 665 395** or **DE-A-195 32 959**.

1.2 The subject matter of Claim 1 goes beyond the prior art in that a constellation enlargement is introduced (mapping diversity) therein. Two transmission symbols are generated from each information symbol to which said transmission symbols are clearly allocated. The transmission symbols differ from each other and from the information symbols.

1.3 Such a process is not obvious from the prior art.

According to **US-A-3 665 395** and **DE-A-195 32 959**, the

deferred-transmission symbols are identically constructed. There is no constellation enlargement.

EP-A-0 572 171 discloses a diversity process wherein copies of the same information symbol are varied differently. This process does not concern a constellation enlargement because no clear allocation occurs between information symbols and transmission symbols. The copies of the information symbol are weighted only with different coding functions and therefore can assume all possible values. Furthermore, there is simultaneous rather than deferred transmission of the coded copies.

US-A-4 606 047 also comprises no constellation expansion. The to-be-transmitted signals can assume only two values (0 or 1). During the transmission of a value, the complementary value is transmitted simultaneously through a second channel. That is to say, the same constellation is used.

GB-A-2 291 314 is less relevant because no diversity procedure is disclosed. All information is transmitted only once.

2. The above-mentioned conclusion also pertains to Claims 2, 11, 20, and 30, which correspond to Claim 1.
3. The dependent claims pertain to special embodiments of the subject matter of the above-mentioned independent claims and are therefore likewise novel and inventive.